

Utilities offer loans to promote residential solar

While the cost of renewable energy systems and energy-efficient technology is slowly coming down, most homeowners still need loans to make major home energy improvements—loans that financial institutions are often reluctant to make. To remove one of the main barriers between residential customers and greater energy efficiency, some utilities are setting up their own loan programs.

“The reason is that most banks are driven by the numbers,” explained Howard Mallory, a banker with Community Bank of Colorado in Aspen. “The residential market hasn’t shown a bias yet for solar-efficient homes over traditional housing. There is no certainty that the system will add value to the collateral. The bank has to know that the system will continue to function after the present owner is gone.”

“For commercial buildings, a solar upgrade is different—like replacing an old coal-fired furnace with a natural-gas unit,” Mallory continued. “It’s a newer technology that will reduce the owner’s operating costs, so it has a demonstrable value.”

Colorado program

Community Bank and the Community Office for Resource Efficiency in Colorado’s Roaring Fork Valley have teamed up to provide zero-percent financing on loans for residential photovoltaic or solar hot water systems. The loans are available to any full-time valley resident served by Holy Cross Energy, City of Aspen Electric System, City of Glenwood Springs Electric System or Xcel Energy. The typical loan term is five years with amounts varying by system size. Participants are responsible for the principal payments, and CORE covers the interest with money from its Renewable Energy Mitigation Program.

Homeowners actually have a choice between the loan and a direct cash rebate. “When we started the program five years ago, we wanted to offer options, and we didn’t know which one people would prefer,” said CORE Associate Director Gary Goodson.

The rebate has been more popular because it helps cover the up-front cost of installation, said CORE Executive Director Randy Udall. “Between CORE’s \$1,000 rebate and the \$2,000 Federal rebate, the cost of the system is cut in half,” he said.

Community concern

Even with the incentives, solar water heaters are considerably more expensive than conventional



The Community Office for Resource Efficiency gave Snowmass Village, Colo., a \$40k grant to install a solar water heating system on the town’s recreation center. The city of Aspen’s Renewable Energy Mitigation Program funds CORE programs. (Photo by Community Office of Resource Efficiency)

units. However, long-term benefits overcome simple economics, which is why utilities are getting involved. “Gas-fired water heaters waste half the energy they consume, and there are 60 million gas-fired units in the country,” Udall pointed out. “The potential savings in energy and emissions is enormous.”

While CORE’s programs have helped to make the Roaring Fork Valley what Udall describes as a hotbed of solar technology, other factors deserve credit, too. Holy Cross offers the best incentives for renewable generation in Colorado and frequently appears on National Renewable Energy Laboratory’s annual list of Top 10 green power providers.

Also, many residents—especially in and around Aspen—moved to the area for the natural beauty and are

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able to invest in protecting it. Their support made REMP possible, and the \$7 million the program has generated since 2000 supports CORE's work, said Goodson.

Reviving interest

California's Public Benefits Fund provides a similar pool of funding that Sacramento Municipal Utility District draws on for its Solar Domestic Hot Water Program. "We offer financing for a lot of energy-efficient upgrades for the home, including windows, insulated siding, duct sealing and wall and attic insulation," said SMUD Residential Product Services Specialist Jon Elissalde.

SMUD's loan program for solar water heaters, which began in 1990, provides a \$1,500 rebate and a 10-year, 7.5 percent-interest loan to residential customers who replace electric water heaters. Most of the water heaters in SMUD's territory are gas-fired, Elissalde noted, so,

"The program peaked at about 3,500 replacements," he said. "For a long time, we were doing only five or six replacements per year. We are starting to see an increase again."

That may be helped along by the Federal tax credit of 30 percent of the system cost up to \$2,000 for qualifying systems placed in service in 2006 and 2007. "We've installed 10 units this year and are on track to reach a goal of 25 installs for 2007," said Elissalde.

All solar water heaters must meet standards set by the Solar Rating and Certification Corporation, be installed by a SMUD-approved solar contractor and pass inspection by SMUD representatives. SMUD currently has a list of five qualified contractors who know the specifications for installing the unit and have the proper licensing and insurance. "There were two contractors who left the program and came back recently," Elissalde commented. "We hope that's a sign that consumer interest is picking up again."

The Sun Cache, a new type of solar water heater, could contribute to that revival, Elissalde added. Because the roof-mounted unit combines a polyurethane tank with the solar collector, there is no need for a pump and maintenance is minimal. "It performs well and is less expensive than other solar water heaters," he said. "Simplifying the technology makes it more attractive to consumers."

More funding options

Ultimately, the key to getting consumers to install solar water heaters and other energy-efficient or energy-self-sufficient technology

is long-term savings, said Mallory. "Borrowers will have to see lower energy bills and lower interest rates, and somebody has to be willing to absorb that quarter percentage point," he stated.

Some homeowners may be eligible for Federal programs designed to deliver those savings. Fannie Mae, Freddie Mac, Housing and Urban Development's Federal Housing Administration and the Veteran's Administration offer different types of energy-efficient mortgages. "Theoretically, what people save on monthly energy bills can be applied to a larger home loan," explained Mallory. "Unfortunately, these programs are not as well-publicized as they could be."

Udall pointed to a Lakeland, Fla., program as another promising model. "The municipal utility installed solar water heaters on customer homes and charges homeowners for the hot water they use, rather than the equipment," he said. "That's the ideal situation—provided the utility has the money to support it."

Project funding is a challenge for any industry, especially a relatively new one, but utilities, community groups and financial institutions are rising to it. In the days of abundant energy supplies, loan programs like CORE's, SMUD's and others might have seemed risky. Now, in the face of volatile energy prices, environmental concerns and national security issues, utilities are realizing that the potential rewards far outweigh the risk. ⚡

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Utility contracts fund Ellsworth AFB's award-winning energy program

Like an actor receiving an Oscar, the 28th Civil Engineer Squadron Energy Management Team from Ellsworth Air Force Base had a lot of people to thank when they received a Federal Energy and Water Management Award last October in Washington, D.C.

Base personnel, local college students and especially energy supplier Montana-Dakota Utilities all played a part in reducing the South Dakota base's total energy use by 47 percent between 1985 and 2003, and an additional 17 percent from 2003 to 2006. "MDU took the long view and did a fantastic job," said now-retired 28th CES System Engineering Chief Dennis Svalstad.

Svalstad referred to Ellsworth's partnership with MDU on the utility energy service contract. The most recent task order issued under the UESC, completed in FY 2005, covered 100 projects and impacted nearly every person on base. Through the \$4.3 million task order, the base installed air de-stratification fans and high-efficiency lighting systems in more than 47 facilities. Additional upgrades in some buildings included new natural gas radiant heating systems, window replacements and high-efficiency boilers. Total annual savings from these projects amounted to more than \$470,000 and 66.9 billion Btu.

Partnership secures funding

The partnership began nine years earlier when Svalstad wanted to upgrade the base's dual-fuel natural gas/fuel oil heating systems. The base bought about 50 percent of its natural

gas on an interruptible basis, using fuel oil as a backup fuel source. This meant sending crews out to manually switch boilers from natural gas to fuel oil on the coldest nights of the year when natural gas service was curtailed. Also, since the boilers were only switched to fuel oil occasionally, they became maintenance problems. The underground oil storage tanks were prone to leaking, creating an environmental concern.

Svalstad learned of a propane-air mix plant that would eliminate the need for backup boilers, but there wasn't money in the budget to install the system. With the assistance of Headquarters Air Combat Command and Air Force Civil Engineering Support Agency personnel, Svalstad approached the base's energy suppliers with the idea of paying for the project with a utility energy services contract.

Under a UESC, the franchised or serving utility arranges the financing for an energy-efficiency improvement and executes the project. The customer repays the utility with the energy cost savings. The Federal Energy Management Program is an excellent resource for Federal agencies in developing these contracts.

Large energy services contractors like Honeywell and NORESKO can also execute third-party-financed projects under similar energy savings performance contracts, but Svalstad preferred going through Ellsworth's local utility. "A local utility has a stake in what happens in the community, and it's going to be there when the job is done," he said.

MDU project manager Chuck Miller agreed with Svalstad about the



These tanks are part of the propane-air mix plant that Ellsworth installed under its utility energy services contract with Montana-Dakota Utilities Co. UESCs help Federal facilities finance large-scale energy efficiency improvements. (Photo by Ellsworth Air Force Base)

utility's interest in the partnership. "Ellsworth is one of our biggest customers, and keeping the base open is a big issue, not just for the community but for the entire state," he said.

Not all power suppliers are eager to support projects that reduce energy consumption, but the investor-owned, natural gas-distribution utility saw it as an opportunity. "By cutting Ellsworth's load, we could expand our distribution capacity without building new pipelines," Miller pointed out. "It was a win-win situation for everyone."

Success sets stage

Svalstad and Miller worked out the potential savings from the plant, and Ellsworth signed with MDU to conduct a feasibility study. The study confirmed initial estimates, so the utility put up the funding for construction. The first contract established the process for future projects. "Chuck and I sit down and brainstorm on improvements. Sometimes, departments will come forward with suggestions," Svalstad said. "Once we come up with number projections, MDU will do the feasibility study. If it looks like a good investment, the project moves forward."

On UESC projects, MDU selects most of the subcontractors and

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equipment, which streamlines the purchasing process, said Svalstad. “We still have to provide oversight, because costs have to be in line with similar military construction projects,” he acknowledged. “But the utility can avoid some of the scheduling costs that are a necessary part of government contracts, and those savings can be used to install a better grade of equipment,” he said.

And the more efficient the system, the shorter the payback. Using very conservative numbers, Ellsworth and MDU, estimated that the propane-air mix plant would save the base about \$500,000 annually on energy costs. Actual savings were closer to \$1 million, recalled Svalstad. “It was great, except that we had all this money on the table that could have been used for more projects,” he said. “Although we are still very conservative, we’ve learned to tighten up our figures since then.”

Miller added, “As gas and electricity costs rise and technologies improve, we revisit projects that didn’t make the cut the first time we looked at them. Sometimes, the payback improves.”

Svalstad advised including maintenance as part of the contract, since that area often falls victim to budget-cutting and it directly affects a system’s performance. “If you don’t take care of equipment, it loses efficiency, and you don’t get the expected savings,” he pointed out. “MDU included 10 years of maintenance on our infrared heaters in our most recent UESC. They are willing to do that because that’s how they get paid.”

Cooperation needed

It takes more than maintenance to ensure that an energy-efficiency improvement pays for itself, however. Svalstad and Miller—now part of the Ellsworth Energy Management team—attend a lot of energy conferences to keep up on latest energy-saving technologies. Getting the most out of a UESC means building a relationship with your utility, Svalstad insisted. “Both sides have to develop confidence in the other. It’s more of a partnership than a contract.”

Another partnership helps keep labor costs on UESC projects down while it builds energy management skills in tomorrow’s workforce. Ellsworth participates in the Keep a Student in School Program, hiring engineering students from local colleges to work on UESC projects. Jon Rexroad, a School of Mines mechanical engineering sophomore student, has been a member of the award-winning Energy Management Team for the past three years. “The biggest rewards of working here at Ellsworth have been the work experience and the contacts I’ve made with other people,” he said.

Rexroad and another student, Christopher Tinsley, performed coordination tasks on the most recent UESC project under the direction of Project Manager Lisa Teeslink. Coordination was a critical part of the project, Rexroad said, since so much work was being done in the flight line, and contractors needed escorts to get into secure areas. “Security staff was very flexible and helpful once we explained the project,” said Rexroad, “especially when it involved upgrading heating.”

Each base agency contributed to Ellsworth’s energy-saving efforts, too. In some cases, the contribution was as direct as engineers incorporating energy-efficient concepts and equipment into planning and design. Other agencies applied their expertise to putting existing resources to the best use. “The real property department, for example, made sure that people were in buildings that fit their need,” said Svalstad. “If you try to use a hangar or a warehouse as an office, it’s going to be a very inefficient office.”

Creating buy-in

Using the “soft sell” approach, the energy management team also promoted simple conservation measures that everyone can put into practice. “In a military environment, more persuasion and less dictation works best,” Svalstad said. “I spent a lot of time early in the program, just talking with different people about ways to keep energy costs down. People were more likely to turn off a light or shut a window if it was their idea.”

It wasn’t always easy to explain to superiors the time spent educating base personnel about energy efficiency, but results justified the effort. “Encouraging people to take responsibility for their energy use freed the team to concentrate on controlling project costs,” said Svalstad.

So when members of the 28th Civil Engineering Energy Management Team stepped up to the podium to accept their award from FEMP, they were happy to share the credit. Ellsworth Air Force Base’s energy reduction program is a blockbuster, and the producers know they couldn’t have done it alone. ⚡

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Tri-State, Columbus create irrigation and motor workshop for growers

The growing season is upon us, and growers throughout Western's service territory are turning to thoughts of...efficiency. "It's a very competitive business for growers, and everyone is looking for the most effective and efficient use of resources," said Chris Martinez, marketing manager for Columbus Electric Cooperative.

Large agriculture load

Martinez knows whereof he speaks: agriculture customers make up 40 percent of Columbus' sales. The Deming, N.M., cooperative serves Luna County, the largest chili growing region in the United States. Its 7,000-sq. mile territory also produces alfalfa, wheat, melons, onions and other vegetables.

The irrigation methods used on those crops run the gamut, Martinez observed. Some growers use sprinklers or flood irrigation, "But most are moving toward drip systems," he said. "They find they get a better yield using the same amount of electricity and water."

Columbus also offers a \$20-per-horsepower rebate for high-efficiency motors, a popular incentive that many customers have used to upgrade their equipment. Efficiency varies in the different types of motors, however, said Martinez. "Vertical hollow shafts are premium efficiency, but it's hard to find an efficient submersible motor," he explained. "Motors are a real challenge to efficient farming operations."

In an effort to address that issue, Columbus is sponsoring a free Motors and Irrigation Efficiency workshop May 23. Western is cosponsoring the

event with Tri-State Generation and Transmission Association, Columbus' power wholesaler. "Tri-State is really taking the lead on this," said Rocky Mountain regional Energy Services Representative Linda Swails. "They've done a great job of pulling the material together and tailoring it to the audience."

"We ask what our members need to help their customers, and we try to give that to them," said Tri-State Senior Engineer Mike McCoy. "Improving efficiency in farming and ranching operations can have great economic benefits for the entire community, but that's a lot for one co-op to tackle."

Workshop based on need

Utilities in agriculture-intensive areas need to keep up on motors and irrigation systems, Martinez agreed, which is why he attended a motor workshop at Tri-State last year. "There was a lot of good information to pass on to our customers, especially about MotorMasters+ software," he recalled.

The subject came up later, when Martinez was visiting with large customers. "Reducing operating costs is always a big concern for growers, and several asked if we could test irrigation motors for efficiency," he said. "I told them about MotorMasters+, and they said they would like to have that kind of program for irrigation."

Martinez took the suggestion to Swails and McCoy, who thought the idea sounded like something other Tri-State members could use as well. "Tri-State has about five co-op members that are heavy irrigators," he said. "Columbus' request inspired us



Irrigation, like this pivot point system, represents a major load for many rural utilities. That's why Western is teaming up with two customers to present a free workshop to help growers improve their efficiency. (Photo by Tri-State Generation and Transmission Association)

to get involved in an area that potentially promised big energy savings."

McCoy asked a speaker from Tri-State's motor workshop to develop a version targeting irrigation. The National Food and Energy Council also provided input on workshop content. The biggest problem, McCoy observed, was narrowing down the agenda to fit in a one-day format. "It's such a broad topic—you could spend a whole day alone on electric motor basics and picking the right motor for the application," he insisted. "Then there's all the material specific to energy- and water-efficiency for farms and ranches. It could have easily turned into a three-day seminar, but we had to pare it down to something doable."

Full agenda

That still leaves a full agenda developed and presented by instructors from Texas A&M. Sessions will cover how systems work together, what types are most commonly used,

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Energy Shorts

Western customers in NREL Top 10

The National Renewable Energy Laboratory released its annual ranking of leading utility green power programs, and several Western customers appeared on the lists.

The voluntary programs allow consumers to help support additional electricity production from renewable resources such as solar and wind. More than 600 utilities across the United States offer these programs.

Using information provided by utilities, NREL develops “Top 10” rankings of utility programs in the following categories: total sales of renewable energy to program participants, total number of customer participants, customer participation rate and the lowest price premium charged for a green-pricing service using new renewable resources.

Ranked by renewable energy sales, Basin Electric Power Cooperative placed sixth for its wind program. Sacramento Municipal Utility District’s program, which offers power from wind and landfill gas, was seventh in sales.

SMUD placed in every category, ranking fourth for total number of participants, fifth in customer participation rate and 10th in pricing. Los Angeles Department of Water & Power held seventh place for total participants.

Western customers made an impressive showing for customer participation rates. The City of Palo

Alto Utilities topped the category with 16.9 percent customer participation, followed closely by Lenox Municipal Utilities with 16.6 percent. Following SMUD’s 6.2 percent participation rate were Silicon Valley Power with 6.1 percent and Holy Cross Energy with 5.6 percent.

Customer choice programs are proving to be a powerful stimulus for growth in renewable energy supply. In 2006, total utility green power sales exceeded 3.5 billion kilowatthours, about a 30-percent increase over 2005. More than 500,000 customers are participating in utility programs nationwide, up more than 10 percent from 2005.

Roseville Electric, Christopherson build BEST homes

A partnership between Roseville, Calif., Electric and Christopherson Homes will build 127 energy-efficient houses with integrated rooftop solar power systems.

The agreement is part of the municipal utility’s Blueprint for Energy Efficiency and Solar Technology Homes. Recently approved by Roseville’s city council, the BEST Homes program offers incentives to ensure 10 to 20 percent of new homes built over the next decade in Roseville will be energy-efficient and generate power.

The homes Christopherson plans to build in West Roseville will include rooftop photovoltaic solar systems,

highly efficient air conditioning, insulation and water heating systems as well as Energy Star-certified appliances. Those features can reduce residents’ energy consumption by as much as 50 percent.

Christopherson Homes and other participating developers can receive as much as \$8,530 in rebates for every home built with BEST standard options. The rebates are equal to about half the cost of the rooftop solar system and energy-efficient features. Money for the BEST Homes program will come from Roseville Electric’s public benefits fund.

The BEST Homes program is part of Roseville Electric’s long term strategy to protect the environment by reducing energy demand and avoiding greenhouse gas emissions. Over the next decade, Roseville Electric anticipates that building 3,200 BEST Homes will save up to 14 million kWh of energy annually.

Basin Electric supports 25 x ‘25

At their February meeting, Basin Electric Power Cooperative’s directors passed a resolution endorsing the national “25 by ‘25” initiative for renewable energy.

The “25 x ‘25” Initiative sets a voluntary goal for 25 percent of the nation’s energy sources – electric power, transportation fuels, industrial and commercial – to come from renewable resources, including hydropower, by the year 2025.

The initiative originally began with a group of volunteer farm leaders, but has since gained support from a broad cross section including agriculture and forestry, business, labor, conservation and religious leaders.

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Today, more than 330 businesses and organizations support the initiative.

On a national level, the National Rural Electric Cooperative Association, 22 governors and five state legislatures have endorsed the initiative.

“This initiative ties in nicely with the renewable objective Basin Electric adopted in 2005 that calls for 10 percent of the generating capacity needed to meet member demands to come from renewable energy sources by 2010,” says Ron Harper, Basin Electric CEO and general manager.

Basin Electric currently purchases the entire output of three wind farms owned and operated by FPL Energy – one near Edgeley/Kulm and one near Wilton in North Dakota, and another near Highmore in South Dakota; and two other 750-kilowatt wind turbines, one located near Pipestone, Minn., and another near Rosebud, S.D. The North Dakota-based power cooperative also purchases the entire production of four recovered energy projects located along the Northern Border Pipeline.

Climate-neutral campuses

Seventy-nine college and university presidents have signed on to the American College and University Presidents Climate Commitment, promising to achieve “climate neutrality” on their campuses. The agreement is modeled after a similar pact made by city mayors across the country.

Signed mostly by the heads of smaller institutions, signers also include heads of larger schools such as University of Florida with more

than 50,000 students, the University of Colorado-Boulder with 29,000 students and the University of Hawaii Manoa campus with 20,600 students.

The founding members of the climate commitment effort aim to have signatures on letters of support from more than 1,000 university presidents by the end of 2009.


To reach climate neutrality, campus carbon dioxide emissions must be offset by the use of renewable energy and oxygen released from trees and other plants on campuses. The presidents are working with the Association for the Advancement of Sustainability in Higher Education, ecoAmerica and Second Nature to achieve their climate neutral goals.

Wind integration study finds grid can handle up to 25% wind

With the right policies, utilities can incorporate wind power into their portfolio, comprising up to one-fourth of their delivered energy, without sacrificing reliability and with minor costs for absorbing the wind.

Those are the findings of the Midwest Wind Integration Study required by the Minnesota legislature to evaluate reliability and other impacts of higher levels of wind generation. According to EnerNex Corporation and WindLogics, which carried out the study, the total integration cost for up to 25 percent wind energy delivered to all Minnesota customers is \$0.0045 per kWh of wind generation. The 25-percent penetration level of wind is predicated on operating in the Midwest Independent System Operator service area, control area consolidation currently underway

in MISO, geographic diversity of the wind power and adequate transmission.

“The study is especially significant both because of the amount of wind involved and the fact that it was sanctioned by the Minnesota legislature,” said American Wind Energy Association Deputy Policy Director Mike Jacobs. “The Minnesota study shows that, when the wind generation is spread around the state, and MISO markets and operators do what they do best, integration costs are a small concern. Like the studies that have come before, this report shows the relative ease in absorbing the wind—opening the way for wind energy’s benefits to be reaped on a large scale for consumers, and for our economy, environment and energy security.” 

Calendar of events

Visit Western’s regularly updated Energy Event Calendar for a complete list of seminars, workshops and conferences.

<http://www.wapa.gov/es/pubs/esb/2007/may/may07coe.htm>

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what factors affect efficiency and how to estimate monthly energy use. Controls, motor protection and using variable-speed drives will also be discussed. Participants will learn about resources for keeping up on best practices and funding opportunities to help them improve efficiency. A manual of valuable reference materials is included in the price of registration. "Our goal is to give people a working knowledge of the available technologies in 'real-world' applications," said Martinez.

Utility staff and growers are the main audience for the workshop, but Martinez said that vendors, water and sanitation providers, well drillers and electricians will all find value in the event. The course information will be accessible for newcomers to irrigation, too. "We try to make all our workshop presentations as user-friendly as possible," said McCoy. "Energy efficiency shouldn't be the concern of only engineers or facility managers. Everybody who works with a business can contribute to its efficient operation if they understand a few basic principles."

At the end of the growing season, Columbus and Tri-State will be looking for feedback from workshop participants. Tri-State will use the input to refine the material for presentation to other member co-ops with heavy agriculture loads. "Anything Tri-State can do to help the end-user improve efficiency will help everyone in the power delivery chain," declared McCoy.

To register for "Motors and Irrigation Efficiency," contact Chris Martinez or Rachel Marrufo at 505-546-8838 or 800-950-2667. Deadline for registration is May 9.



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